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Contextual Teaching And Learning (CTL) For Geometry Learning Module

D.T. Wahyuningtyas, N. Yuniasih,
Universitas Kanjuruhan, Malang. Indonesia

E.B. Irawan & Susiswo
Universitas Negeri Malang. Malang Indonesia

ABSTRACT: The objective of this research was for developing geometry learning module by using Contextual Teaching and Learning (CTL) approach. Through CTL strategy, the students would learning through 'experiencing' not 'memorizing'. This module was contained activity by making meaningful linkages, presentment of problem in open-ended, cooperate, the provision of individually services by understanding checking, and self-assessment. Phases of development geometry learning module were: (1) preliminary research, (2) prototyping phase, and (3) assessment phase. The result of designing in prototyping phase was geometry learning module design by using CTL approach. CTL components on geometry learning module were: (1) Making meaningful connections, (2) Self-regulated learning, (3) Collaborating, (4) Critical and creative thinking, (5) Nurturing the individual, (6) Reaching high standard and using authentic assessment. Draft module consist of (1) module description, it consisted of core competence and basic competence which would be reached (2) the instruction of using the module, it explains the introduction, measurement of the initial ability, activities sheet, conclusion, assessment column, work sheet, and answer key.

1. INTRODUCTION

The development of students' potential above are also proper by 2013 curriculum oriented which increasing and balancing between attitude, skill, and knowledge. 2013 curriculum for primary school was developed by using built-in thematic approach from the first grade to sixth grade that the activity is done step by step. Thematic learning is a learning system which able looking up actively as individual or in a group by the students, finding concept, and lore principles in holistic, meaningful and authentic (Majid, 2014: 80). Built-in learning starts from scheme knowledge development that exists in students' mind. It is proper constructivism philosophy which cognitive knowledge of the students is able to solve by self-regulation. In this case, emphasizing if learning is not only memorizing, but the students have to construct the knowledge in their mind. One of the concepts of constructivism learning theory is an ideal vision of the students as self-regulated learner, for example the student is able how to describe a hard question become simple steps or trying alternative solution (Slavin, 2009: 13). Through that constructivism base philosophy, CTL was promoted as a new alternative learning strategy and hopefully the students learning through 'experiencing' not 'memorizing' (Nurhadi, 2009: 10).

Contextual approach is approach of learning concept which helps a teacher links between taught material by students' real situation and push students to make a relation between their knowledge and the application as a member of family and society (Ministry of Education2003: 1). Through contextual approach, a learning process take place as natural that the students working and experiencing, not only transferring knowledge. By principles that developed in contextual approach

expected the students are able to realize if they are learning something important for their life. Therefore, they are positioning themselves as people who need provisions for their life. Some researchers have found if a student who has high achievement is often a learner with self-regulation (Santroch 2009: 334). Independent learning is in line by shifting the role of a teacher from his role as main source become learning facilitator. Therefore, for maximize students' independence; it needs a structural independent learning material, one of them is by giving a high quality learning module.

The Directorate General of Primary and Secondary Education (2004) stated in General Election Guidelines and Utilization of Teaching Material are written with purpose in order students are able to learn independently without any instruction or teacher's guidance. In this case, a module can replace a teacher function. A teacher is able to use a module as teaching material or learning source, but a teacher's role is almost lost. Learning by module has already done a lot in schools, such as in open schools. Learning by module is learning per part in sequence to reach the whole of principle learning mastery. From the usage that can be used without a teacher, therefore a module should be filled by detail matters about learning which done from objective, plan, learning material to evaluation which used in learning.

Besides, for developing high quality module, we need to observe the characteristic that need in a module (Riadi: 2013) namely: (1) self-instruction, students are able to learn independent; (2) self-contained, the whole of learning material from one unit competence that learned contained in a single module; (3) stand alone, the module which developed not depend on other media nor should be used in gather with other media. Suryosubroto (1983) conveyed the aim of the module in teaching and learning is in order: (1) the objectives of learning can be reached efficiently and effectively; (2) students are able to follow education programme agree with speed and strength of themselves; (3) students are able to appreciate and do self-learning, in guidance of teacher or not; (4) students are able to assess and understanding their own learning result in continually; (5) students as centre point in teaching and learning; (6) progress of the students can be followed by higher frequency through evaluation which done in the last module; (7) a module constructed by a concept "mastery learning", a concept that emphasize if students should be mastering subject matter in module optimally. This principle contains consequence if a student does not able to take the next programme before he is mastering at least 80% from this material.

Module excellence can be put forward as follows (1) focus on individual ability of the students inasmuch in essence they have ability to work independently and more responsible of their own activities; (2) there is a control towards result study through the use of standard competence in each module that must be reached by the students; (3) relevance of curriculum is addressed by there is an aim and the way to reach, therefore students can know the linkages between learning and result that will be gotten. However, the review of the study of teaching material which able to be used in field is not enough in constructing plane and solid concept and less in developing students' creativity independently. Besides, there is no practical and efficient learning module of geometry by using CTL approach in the field to be used as reference in learning. Therefore, the researcher needs to develop geometry learning module by using CTL approach.

The primacy of module development that was developed by using CTL approach was an effort to improve quality of learning for getting a meaningful learning especially in learning geometry. This geometry learning module was expected can help teacher in developing material in students' book and teacher's book,

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improve students' result in understanding geometry material plane and solid, and improving cognitive ability through problem solving, increasing independence, and motivate students to study more. Specification of the product mathematic learning module that developed was independent module for students on geometry material that contained of activities to increase understanding, critical thinking, and creative through problem solving, asking question, and completion of the problem open ended on plane and solid material.

2. RESEARCH METHODS

The focus of this study is developing valid, practical and effective Geometry learning module by using CTL approach for primary school. It used research and development method in education. Development learning module in this research was following development model phases conveyed by Plomp (2007). These development phases were done in two phases, namely: (1) preliminary research, and (2) prototyping phase. These activities are described consecutively which done in each development phase.

1. Preliminary research

In this phase, the researcher did a deep observation in some things, including: (1) availability of learning sources and learning situation with some facilities such as hand book, and condition of teaching and learning process, (2) how the condition of the teacher in doing teaching and learning mathematics, reviewed from the preparation, implementation, assessment or teacher's behaviour within learning by using CTL approach.

2. Prototyping phase

Based on observation result, reflection and first analysis were constructed problem solving design. The plans are including; (1) learning module design, (2) learning media design, and (3) research instrument design. Those three designs were created at the same time.

Subject of the study were students in 4 and 5 grade in Malang primary school. Instrument that would be designed in this development research was module validation sheet and students' activities observation sheet. Validity module data analysis was obtained from Validation module questionnaire by a learning expert, mathematics education expert, and a teacher in primary school.

3. RESULTS AND DISCUSSION

In the preliminary research, the researcher did a deep observation in some things, including: (1) availability of learning sources and learning situation with some facilities such as hand book, and condition of teaching and learning process. The result was unavailability of mathematic textbook that supports geometry learning by using CTL approach. (2) A learning process that involves mathematics learning for preparing primary school students have a tendency to use conventional method. How the condition of the teacher in doing teaching and learning mathematics, reviewed from the preparation, implementation, assessment or teacher's behaviour in learning process. The interview result from some teachers in Sukun district, Malang, still many who have not understood about teaching and learning process by using CTL approach. The result design in prototyping phase was design learning module by using CTL approach.

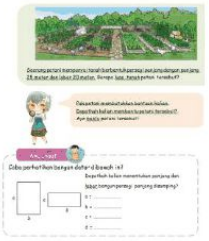
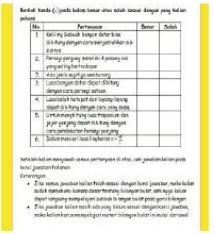
In this phase was making component learning module by using CTL approach for teaching number in primary school. This module is labelled learning number which consists of five part, namely: (1) characteristics of plane, (2) circumference and area of plane, (3) characteristics of solid, (4) net of solid, and (5) circumference and volume of solid. Module components composed: (1) module description, it consists of core

competence and basic competence which will be reached (2) the instruction of using the module, it explains the introduction, measurement of the initial ability, activities sheet, conclusion, assessment column processing sheet, and answer key.

Specification of the product that developed in this research was Geometry learning module by using CTL approach for primary school. The module that created was expected meet the criteria: valid, practical and effective. Inasmuch this research is limited to the completion of the module draft that had been created. Module draft consists of: (1) module description and (2) user manual module. Module description is including core competences and base competences that will be reached. Specific scheme of material's content in this module is plane learning and solid learning. For integers learning composed: : (1) characteristics of plane, (2) circumference and area of plane, (3) characteristics of solid, (4) net of solid, and (5) circumference and volume of solid.

User manual module contains introduction, measurement of initial ability, activities sheet, conclusion, work sheet, assessment column, and answer key. Introduction contains an overview to apperception in the beginning of learning that linked by other subject and daily events in order the students can be motivated to learn more. For measuring of initial ability contains some questions and information for the next students' activities. Activities sheet contains questions and media to be solved by the students. Conclusion contains a sheet for writing a conclusion based on the activities that have been done. Work sheet contains a sheet for answering the question. Assessment column contains a place for writing the correct answer after the students see the answer key, teacher's information of students' work result and the score that they have gotten. Answer key contains the all of the correct answer in each activity.

Table 1. Syntax of geometry learning module by using modified CTL approach

CTL Components	Components of the module	Students activities	Example of implementation in the module
1. Making meaningful connections	The example of using or the implementation of plane and solid in daily life such as diamond and marbles, etc	Look at the given examples and find another example from the use or implementation plane and solid in daily life	
2. Self-regulated learning	Giving problem in problem posing	Linking the information that have been given for creating a question and answer it.	
3. Collaborating		Discussing with a friend about open ended question and checking answer each other.	
4. Critical and creative thinking	Giving a problem in open ended and problem solving.	Solving the problem in several ways and comparing answer with their friend for taking a conclusion from those answers.	
5. Nurturing the individual	Giving measurement of initial ability for students and guidance stated in the module for making a conclusion from	Doing an assessment towards their learning result and following the instruction for continuing their learning or repeating and	

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CTL Components	Components of the module	Students activities	Example of implementation in the module
	the material.	learning to make a conclusion.	
6. *Reaching high standard and using authentic assessment*	Giving assessment column individually towards learning result.	Assessing their own learning result after answering trial competences that given, checking the tasks in the module, and the teacher gives the information towards students' work result.	

Based on syntax of geometry learning module by using modified CTL approach consisted of 6 components namely (1) Making meaningful connections, (2) Self-regulated learning , (3) Collaborating , (4) Critical and creative thinking , (5) Nurturing the individual , (6) Reaching high standard and using authentic assessment. Those things were corresponding by CTL components that developed by Johnson (2002: 24)

4. CONCLUSIONS

Based on preliminary research, the impact of the use of teaching materials that less in presentation the concept of mathematics therefore students has difficulty to understand the material especially in geometry namely plane and solid. Independence students' ability less developed maximally with routine exercise and teacher-centered learning. Because of these problems the researcher was developing geometry learning module by using CTL approach in primary school. The result design in prototyping phase was design learning module by using CTL approach that consisted of 6 components namely: (1) Making meaningful connections, (2) Self-regulated learning , (3) Collaborating , (4) Critical and creative thinking , (5) Nurturing the individual , (6) Reaching high standard and using authentic assessment. The module draft consists of: (l) the module description, which contains the core competencies and basic competences to be achieved; (2) instructions for using the module, containing the introduction, initial capability checks, worksheets, sample assessment worksheet columns, and answer keys.

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